R<sub>8</sub> and R<sub>9</sub> are independently oxygen, or sulfur; Q6, Q7, and Q10 may optionally be unsaturated containing one or two double bonds in the 6-membered ring;

Z is amino, hydroxyl, thiol, formyl, carboxyl, cyano, alkylcarbonyl, arylcarbonyl, azido, or one of the fol- 5

wherein  $R_4$  is alkyl, alkenyl, alkynyl, amino, cycloalkyl, heterocycloalkyl, alkylsulfonyl, arylsulfonyl, benzyl, aryl, heteroaryl, alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxycarbonyl, alkylthiocarbonyl, cycloalkyloxycarbonyl, aryloxycarbonyl, arylthio-carbonyl, aryl-thiocarbonyl, heteroaryloxycarbonyl, aminocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, heteroarylaminocarbonyl, alkoxycarbonylcarbonyl or arylcarbonylcarbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the fol- 25 lowing: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, alkyklcarbonyl, alkylcarbonyloxy, alkoxy, alkoxycarbonyl, alkylthio, alkylthiocarbonyl, alkoxythiocarbonyl alkylaminocarbonyl, arylaminocarbonyl, alkylsulfonyl, alkenyloxycarbonyl, alkynyloxycarbonyl, aryl, arylcarbonyl, aryloxy, aryloxycarbonyl, arylthio, heteroaryl, heteroaryloxycarbonyl or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxycarbonyl, aryl, or heterocycloalkyl; and R<sub>5</sub> is hydrogen or any one of the groups represented by R<sub>4</sub>; or R<sub>4</sub> and R<sub>5</sub> could combine to form a 4-8 membered heterocyclic ring;

$$-N = \begin{pmatrix} R_c \\ R_c \end{pmatrix}$$

wherein R6 represents alkyl, haloalkyl, dialkylamino, unsubstituted or substituted aryl and heteroaryl; and R7 represents hydrogen, halogen or any of the groups 50 represented by Rs;

- OR₄,
- -SR₄,
- $-CH_{2}R_{10}$ ,
- $-CH(R_{10})_2$ ,
- -C(R<sub>10</sub>)<sub>3</sub>, or

—CH=CHR<sub>10</sub> wherein R<sub>10</sub> is carboxyl, alkyl, alkenyl, alkynyl, amino, cycloalkyl, heterocycloalkyl, alkylsulfonyl, arylsulfonyl, benzyl, aryl, heteroaryl, alkylcarbonyl, alkenylcarbonyl, 60 alkynylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxycarbonyl, alkyithiocarbonyl, cycloalkyloxycarbonyl, aryloxycarbonyl, arylthio-carbonyl, aryl-thiocarbonyl, heteroaryloxycarbonyl, aminocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, heteroaryl- 65 aminocarbonyl, alkoxycarbonylcarbonyl or arylcarbonylcarbonyl, where any of these groups may be

unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, cycloalkyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy, alkoxycarbonyl, alkylthio, alkylthiocarbonyl, alkoxythiocarbonyl alkylaminocarbonyl, arylaminocarbonyl, alkylsulfonyl, alkenyloxycarbonyl, alkynyloxycarbonyl, aryl, arylcarbonyl, aryloxy, 10 aryloxycarbonyl, arylthio, heteroaryl, heteroaryloxycarbonyl or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxycarbonyl, cycloalkyl, aryl, or heterocycloalkyl;

provided that (1) Z is not alkyl, alkoxy, haloalkyl, haloalkoxy, alkylthio, haloalkythio, alkenyl, haloalkenyl, amino, monoalkylamino, dialkylamino, alkoxyalkoxy or cyano, when Q is Q1 and R2 is haloalkyl.

2. The compound according to claim 1 wherein Z is represented by the following:

30 wherein  $R_4$  and  $R_5$  are the same as defined in claim 1;

or 
$$--CH_2R_{10}$$
,

wherein  $R_{10}$  is the same as defined in claim 1.

3. The compound according to claims 1 or 2 wherein X is halogen or cyano;

Y is halogen;

W is OR;

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R is alkyl, alkenyl, or alkynyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, or carboxyl.

4. The compound according to claim 1 wherein Q is

Q1

wherein R<sub>1</sub> is alkyl, amino, or haloalkyl;

R<sub>2</sub> is haloalkyl;

R<sub>3</sub> is hydrogen;

R<sub>8</sub> and R<sub>9</sub> are independently oxygen, or sulfur.

5. The compound according to claim 1 wherein X is a halogen;

Y is fluorine;

W is OR; R is alkyl, alkenyl, or alkynyl, where any of these groups may be unsubstituted or substituted with halogen or cyano;

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Q1

Q is

$$R_{0}$$
 $R_{1}$ 
 $R_{2}$ 

wherein R<sub>1</sub> is alkyl, amino, or haloalkyl;

R2 is haloalkyl;

R<sub>3</sub> is hydrogen;

R<sub>8</sub> and R<sub>9</sub> are independently oxygen, or sulfur;

Z is represented by the following:

wherein R4 is alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxycarbonyl, alkylthiocarbonyl, cycloalkyloxycarbonyl, aryloxycarbonyl, arylthiocarbonyl, aryl-thiocarbonyl, heteroaryloxycarbonyl, 30 aminocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, heteroarylaminocarbonyl, alkoxycarbonylcarbonyl, or arylcarbonylcarbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups repre- 35 sented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy, alkoxycarbonyl, alkylthio, alkylthiocarbonyl, alkoxythiocarbonyl alkylaminocarbonyl, 40 arylaminocarbonyl, alkylsulfonyl, alkenyloxycarbonyl, alkynyloxycarbonyl, aryl, arylcarbonyl, aryloxy, aryloxycarbonyl, arylthio, heteroaryl, heteroaryloxycarbonyl, or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with 45 halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxycarbonyl, aryl, or heterocyclcoalkyl; and R<sub>5</sub> is hydrogen; or  $-\bar{C}H_2R_{10}$ ,

wherein R<sub>10</sub> is carboxyl, alkyl, alkenyl, or alkynyl, where 50 any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, cycloalkyl, alkylcarbonyl, alkylcarbonyloxy, 55 alkoxy, alkoxycarbonyl, alkylthio, alkylthiocarbonyl, alkoxythiocarbonyl alkylaminocarbonyl, arylaminocarbonyl, alkylsulfonyl, alkenyloxycarbonyl, alkynyloxycarbonyl, aryl, arylcarbonyl, aryloxy, aryloxycarbonyl, arylthio, heteroaryl, 60 heteroaryloxycarbonyl, or methylenedioxy, wherein teh alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxycarbonyl, cycloalkyl, aryl, or heterocycloalkyl.

6. A compound selected from the group consisting of 3-(2-amino-4-chloro-6-fluoro-3-methoxyphenyl)-1-methyl-

6-trifluoromethyl-2,4(1H,3H)pyrimidinedione and 3-(2-amino-4-chloro-6-fluoro-3-methoxyphenyl)-1-amino-6-trifluoromethyl-2,4(1H,3H)-pyrimidinedione.

7. A herbicidal composition, characterized in that it contains at least one compound according to claim 1 and an agricultural adjuvant.

8. A process for preparing a compound represented by the formula I-1 or its salts:

wherein X is hydrogen, halogen, nitro, amino, NHR,  $N(R)_2$ , ainide, thioamide, cyano, alkylcarbonyl, alkoxycarbonyl, alkylsulfonamide, unsubstituted or substituted alkyl, haloalkyl, alkoxy, haloalkoxy, alkoxycarbonylalkoxy, benzloxy, aryloxy, or heteroaryloxy;

Y is hydrogen, halogen, or nitro;

W is hydrogen, OR, SR, NHR, N(R)<sub>2</sub>, CH<sub>2</sub>R, CH(R)<sub>2</sub>, C(R)<sub>3</sub>, halogen, nitro, or cyano, where multiple R groups represent any possible combination of substituents described by R; R is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl, alkoxy, cycloalkyloxy, aryloxy, heteroaryloxy, alkylsulfonyl, benzyl, alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxycarbonyl, aryloxycarbonyl, heteroaryloxycarbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, carboxyl, alkyl, haloalkyl, alkylsilyl, alkylcarbonyl, haloalkylcarbonyl, alkoxy, alkoxycarbonyl, haloalkoxy, haloalkoxycarbonyl, alkylsulfonyl, haloalkylsulfonyl, aryl, heteroaryl, or cycloalkyl;

Q is a heterocycle:

$$\begin{array}{c} R_8 \\ R_1 \\ R_2 \end{array}$$

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-continued

$$\bigvee_{\substack{N \\ N \\ R_1}}^{N} R_1;$$

wherein  $R_1$  is hydrogen, alkyl, haloalkyl, alkenyl, alkynyl, amino, alkoxyalkyl, acetyl, alkoxycarbonylamino, alkylcarbonylamino, or alkoxycarbonyl;

R2 is alkyl or haloalkyl;

R<sub>1</sub> and R<sub>2</sub> could combine to form a five- or six-membered heterocyclic ring;

R<sub>3</sub> is hydrogen, halogen, nitro, amino, alkylamino, haloalkylamino, cyano, or amide;

R<sub>8</sub> and R<sub>9</sub> are independently oxygen, or sulfur;

Q6, Q7, and Q10 may optionally be unsaturated containing one or two double bonds in the 6-membered ring;

Z' is one of the following:

wherein R<sub>4</sub> is alkyl, alkenyl, alkynyl, amino, cycloalkyl, heterocycloalkyl, alkylsulfonyl, arylsulfonyl, benzyl, aryl, heteroaryl, alkylcarbonyl, 40 alkenylcarbonyl, alkynylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxycarbonyl, alkylthiocarbonyl, cycloalkyloxycarbonyl, aryloxycarbonyl, arylthio-carbonyl, aryl-thiocarbonyl, heteroaryloxycarbonyl, aminocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, heteroarylaminocarbonyl, alkoxycarbonylcarbonyl, or arylcarbonylcarbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy, alkoxycarbonyl, alkylthio, alkyithiocarbonyl, alkox- 55 ythiocarbonyl alkylaminocarbonyl, arylaminocarbonyl, alkylsulfonyl, alkenyloxycarbonyl, alkynyloxycarbonyl, aryl, arylcarbonyl, aryloxy, aryloxycarbonyl, arylthio, heteroaryl, heteroaryloxycarbonyl, or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxycarbonyl, aryl, or heterocycloalkyl; and Rs is hydrogen or any one of the groups repre- 65 sented by R<sub>4</sub>; or R<sub>4</sub> and R<sub>5</sub> could combine to form a 4-8 membered heterocyclic ring;

wherein  $R_6$  represents alkyl, haloallcyl, dialkylamino, unsubstituted or substituted aryl and heteroaryl; and  $R_7$  represents hydrogen, halogen or any of the groups

- represented by  $R_6$ ; — $CH_2R_{10}$ ,
- $-CH(R_{10})_2$ ,
- $-C(R_{10})_3$ , or
- -CH=CHR<sub>10</sub>

wherein R<sub>10</sub> is carboxyl, alkyl, alkenyl, alkynyl, amino, cycloalkyl, heterocycloalkyl, 25 alkylsulfonyl, arylsulfonyl, benzyl, aryl, heteroaryl, alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxycarbonyl, alkylthiocarbonyl, cycloalkyloxycarbonyl, aryloxycarbonyl, arylthio-carbonyl, aryl-thiocarbonyl, heteroaryloxycarbonyl, aminocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, heteroarylaminocarbonyl, alkoxycarbonylcarbonyl or arylcarbonylcarbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, cycloalkyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy, alkoxycarbonyl, alkylthio, alkylthiocarbonyl, alkoxalkylaminocarbonyl, ythiocarbonyl arylaminocarbonyl, alkylsulfonyl, alkenyloxycarbonyl, alkynyloxycarbonyl, aryl, arylcarbonyl, aryloxy, aryloxycarbonyl, arylthio, heteroaryl, heteroaryloxycarbonyl or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxycarbonyl, cycloalkyl, aryl, or heterocycloalkyl; provided that (1) Z' is not alkyl, haloalkyl, alkenyl, haloalkenyl, monoalkylamino, or dialkylamino, when Q is Q1 and R<sub>2</sub> is haloalkyl,

which comprises of reacting a compound represented by the  $^{50}\,$  formula II:

with a compound selected from the group consisting of an alkyl halide, alkyl acid halide, aryl acid halide, alkyl acid anhydride, aryl acid anhydride, alkylhaloformate, alkyl isocyanate, aryl isocyanate, alkyl dihalide, aliphatic aldehyde, aliphatic ketone, aromatic aldehyde, and aromatic ketone.

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Q1

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9. A compound represented by the formula III:

w Y Q

wherein X is hydrogen, halogen, nitro, amino, NHR, N(R)<sub>2</sub>, amide, thioamide, cyano, alkylcarbonyl, alkoxycarbonyl, alkylsulfonamide, unsubstituted or substituted alkyl, haloalkyl, alkoxy, haloalkoxy, alkoxycarbonylalkoxy, benzyloxy, aryloxy, or heteroaryloxy;

Y is hydrogen, halogen, or nitro;

W is hydrogen, OR, SR, NHR, N(R)2, CH2R, CH(R)2, C(R)<sub>3</sub>, halogen, nitro, or cyano, where multiple R groups represent any possible combination of substitu- 20 ents described by R; R is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl, alkoxy, cycloalkyloxy, aryloxy, heteroaryloxy, alkylsulfonyl, benzyl, alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, arylcarbonyl, heteroarylcarbonyl, 25 alkoxycarbonyl, aryloxycarbonyl, or heteroaryloxycarbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, carboxyl, alkyl, 30 haloalkyl, alkylsilyl, alkylcarbonyl, haloalkylcarbonyl, alkoxy, alkoxycarbonyl, haloalkoxy, haloalkoxycarbonyl, alkylsulfonyl, haloalkylsulfonyl, aryl, heteroaryl, or cycloalkyl;

Q is a heterocycle:

-continued

$$\bigcap_{N \longrightarrow R_1; \atop R_2} \bigcap_{R_2}$$

wherein  $R_1$  is hydrogen, alkyl, haloalkyl, alkenyl, alkynyl, amino, alkoxyalkyl, acetyl, alkoxycarbonylamino, alkylcarbonylamino, or alkoxycarbonyl;

R2 is alkyl or haloalkyl;

R<sub>1</sub> and R<sub>2</sub> could combine to form a five- or six-membered heterocyclic ring;

R<sub>3</sub> is hydrogen, halogen, nitro, amino, alkylamino, haloaklylamino, cyano, or amide;

 $R_8$  and  $R_9$  are independently oxygen or sullfur; M is nitro.

10. A method for controlling undesired vegetation which comprises applying to a locus to be protected a herbicidally effective amount of a compound of claim 1.

11. The method of claim 10 wherein the locus to be protected is a cereal crop field.

12. The method of claim 11 wherein the compound of claim 1 is applied to soil as a preemergent herbicide.

13. The method of claim 11 wherein the compound of claim 1 is applied to plant foliage.

14. A method to defoliate potato and cotton using a compound of claim 1.

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